MICROBIOLOGICAL STUDY OF BACTERIAL VAGINOSIS AMONG PREGNANT WOMEN IN
AL-DIWANIYA CITY

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ABSTRACT

The study was designed in across-sectional pattern, on 335 pregnant women who attended the department of obstetrics and gynaecology at Maternity and Child Teaching Hospital, and some private clinics in AL-Diwaniya city. They were examined for bacterial vaginosis in the period from September 2002 to the end of February 2003. The present study showed that 96(28.6%) women affected by bacterial vaginosis, 109(32.6%) women presented with abnormal vaginal discharge due to other causes and 130 (38.8%) women without any signs and symptoms of vaginitis G.vaginalis were isolated from 89(93.7%), 3(2.7%) and 45(34.6%)of the above mentioned groups respectively. The main age group of bacterial vaginosis occurrence was (25-35%) years, and was more common among pregnant women in the third trimester of pregnancy (40.7%), where the economic status and parity of patient appeared to play no role on the disease prevalence. It was found that the bacterial vaginosis plays an important and significant role in the causation of preterm delivery (Odds ratio 2.9). It was found that Amsel's criteria are good and valid screening tests in the early diagnosis than the cultural technique, because of their high sensitivity and specificity, which yielded (96%, 95%) respectively. Other microorganisms are mainly Candida albicans (11.9%), Staphylococcus aureus (7.4%), Staphylococcus saprophyticus (4.8%), Beta haemolytic streptococcal (3.6%) and to a less prevalence rates for Neisseria gonorrhea (2.6%) and Trichomonas vaginalis (2.08%).

INTRODUCTION

Vaginitis is an inflammation of the vaginal mucosa, whose incidence appears to be increasing, as estimated that 75% of women will experience at least one episode of vaginitis[1]. Although vaginitis is not serious condition in strictly medical terms, it may have repercussions on a woman's life, and most of them have at least one episode of vaginitis or vaginosis during childbearing years[2], it is an enormous health problem in both developed and developing countries. Bacterial vaginosis (BV) is a poly microbial disease, and although its association with *Gardnerella vaginalis* remains controversial, but now has been largely accepted[3], it is considered as the most common type of infectious vaginitis, accounting to 40-50% of cases[4]. Approximately 800000 pregnant women per year in the United States affected with bacterial vaginosis, and are more likely than women without it to have a preterm delivery or low birth weight[5]. Bacterial vaginosis (BV) which is a polymicrobial in etiology, involving *Gardnerella vaginalis* and other facultative and anaerobic organisms[6]. Candidiasis and Trichomoniasis are well recognized types of vaginitis, *candida albicans* represents about 90% of vaginal candidiasis while other species of candida account for the remaining cases, but trichomoniasis results from vaginal infection with T*richomonas vaginalis*[7]. Among the other causes of *vaginitis, Streptococcal B-haemolytic, Neisseria gonorrhaea*, and C*hlamydia trichomatis* that causes mucopurulent cervisitis, some times cause vaginal discharge[8].

This study was carried out to determine the prevalence of bacterial vaginosis among pregnant women presented with abnormal vaginal discharge and to compair with other causes for vaginal discharge and to asses the association between bacterial vaginosis & preterm delivery.

MATERIALS AND METHODS
PATIENTS

This cross sectional study was done on 335 pregnant women who attended the antenatal care clinic in department of obstetrics and gynaecology at maternity and child teaching hospital and some private clinics in Al-Diwanya city in the period from 1st September 2002 to end of February 2003. A careful history was taken from each patient. Patients who had

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history of diabetes mellitus, immune deficiency disease, sickle cell trait or who had received any type of antibiotic less than 2 weeks previously were excluded from the study.

METHODS

The study was done on samples of vaginal secretions. The tests used to evaluate for bacterial vaginosis were:

Vaginal PH measurement: by using whatman PH paper dipped into the vaginal discharge[9]. Swiff test: by adding a drop of 10% potassium hydroxide to the vaginal discharge with the release of a fishy amine odor. Detection of clue cells by direct examination of vaginal swabs[10]. Culture technique for isolation of Gardrenella vaginalis using *"Columbia agar base"*. Biochemical tests for identification of Gardrenella vaginalis, which are oxidase test, catalase test, carbohydrate fermentation test, indole test, vogas-proskauer test[11]. Detection of *Trichomonas vaginalis* by wet mount examination[12]. Detection of monilial infection by wet mount examination and by culture technique, using sabauroud dextrose agar[13].

Detection of *Neisseria gonorrhoea* by direct stained smear and by culture technique, on chocolate agar inoculation with biochemical test[11]. Detection of *staphylococcus* and *streptococcus* species by culture technique[7,11]. Statistical analysis done by chi-square test used for assessing the association of prevalence and selected factors[14]. The measurement of sensitivity and specificity of single and combined tests (Amsel's criteria), test of validity, odds ratio to determine the risk of premature labor, abortion occurrence with bacterial vaginosis[15].

RESULTS

Among 335 pregnant women who attended the departments of obstetric and gynaecology at maternity & child teaching hospital, and some private clinics, 96(28.6%) of them diagnosed as bacterial vaginosis, depending on Amsel's criteria and culture technique. Then *G. vaginalis* was isolated from 89(92.7%) among those with bacterial vaginosis, also from 45(34.6%) out of 130 unaffected pregnant women, (Table-1).

Table 1. *Prevalence rate of bacterial vaginosis and G.vaginalis among pregnant women.*

Diagnosis	Total No. (%)	Isolated G. vaginalis Positive No. (%)
Bacterial vaginosis	96 (28.6)	89 (92.7)
Other vaginitis	109 (32.6)	3 (2.7)
No vaginitis	130 (38.8)	45 (34.6)
Total	335 (100)	137 (40.8)

The age group which is mostly liable to have bacterial vaginosis in the present study was 25-34 years, which shows a rate of 40.5%. The low rate was reported among females in the age group 35-45 years, which was (13.9%). Out of 135 women in third trimester, 55(40.7%) of them showed bacterial vaginosis, and 31(26.9%) out of 115 women in second trimester showed bacterial vaginosis while 85 women in first trimester, only 10 had bacterial vaginosis. Our study revealed that the highest frequency of bacterial vaginosis occurs among women with parity three and more as 64(29%) out of 220 women examined in this group affected by bacterial vaginosis. The pregnant women with bacterial vaginosis in our study presented with

abnormal vaginal discharge, so it is the main complain. This is followed by other common symptoms such as lower abdominal pain and dysuria with percentage of 81.2% and 54% respectively. But the less common symptoms were dyspareunia and vulvar itching, which were found to be present in only 21.8% and 15.5% among pregnant women who had bacterial vaginosis respectively, There is an increased risk of preterm labour among pregnant women with bacterial vaginosis, Odds ratio 2.9, (Table-2). As 29 pregnant women out of 96 women with bacterial vaginosis, had history of premature labour. While there was no significant difference (P>0.05) in the detection

rate of bacterial vaginosis among those patients with history of abortion and ectopic pregnancy.

Table 2. *The association between history of certain obstetrical problems & bacterial vaginosis among pregnant women.*

History of Obstetrical problems	Positive Bacterial vaginosis n = 96	Negative bacterial vaginosis n = 239	Test of significance
Premature labor	29	31	$X^2 = 5.08$ $P < 0.05$ OR = 2.9
Abortion	15	**40**	$X^2 = 0.06$ $P > 0.05$ OR = 0.9
Ectopic pregnancy	**4**	**8**	$X^2 = 0.12$ $P > 0.05$ OR = 1.2

It was found that the most sensitive parameter, in identifying bacterial vaginosis was pH measurement which was (92%), with specificity of 66%, while the lowest sensitive test, was the swiff test. But the most specific parameter was the clue cell test, with (81%) (Table-3). When a combination (in series) was done among pH measurement, Swiff test, clue cells and thin homogenous discharge, this results in increasing specificity to become 95%, and sensitivity was 96%, with efficiency, of 94%.

Table 3. *The characteristics of Amsel's criteria as tests in screening for bacterial vaginosis.*

Amsel's criteria		Bacterial vaginosis		Total	Sensitivity	Specificity
		+ve case	-ve case			
pH	> 4.5	89	79	168		
	< 4.5	7	160	167	92	66
	Total	*96*	*239*	*335*		
Swiff test	Positive	75	84	159		
	Negative	21	155	176	78	67
	Total	*96*	*239*	*335*		
Clue cells	Positive	84	45	129		
	Negative	12	194	206	87	81
	Total	*96*	*239*	*335*		
Thin homogenous discharge	Yes	77	92	169		
	No	19	147	166	80	61
	Total	*96*	*239*	*335*		

Out of 109 pregnant women with other types of vaginitis in present study, 40(11.9%) of them with *Candida albicans*, 25(7.4%) with *Staphylococcus aureus*, 16(4.8) with S*taphylococcus saprophyticus* and 12(3.6%) with *Beta. haemolytic streptococcus*, while the lowest frequency found *N.gonorrhoeae and T. vaginalis*, with rates of 9(2.6%) and 7(2.08%) respectively.

DISCUSSION

The prevalence rate of bacterial vaginosis was 28.6% among pregnant women who were subjected to this study (Table-1). Which is in agreement with other studies, which showed different rates ranging from 9% to 53%[16,17], one study showed that the rate was 31.2% among pregnant women[18]. For that of G. vaginalis, was 89(92.7%) isolates among pregnant women with bacterial vaginosis, and 45(34.6%) isolates among unaffected one in our result which were higher than the rates conducted in Basrah, the rates of isolated *G. vaginalis* were 6.2%, 7.6% among women with and without habitual abortion respectively[9]. The peak of bacterial vaginosis in the present study was in the age group 25-34 years, with statistically significant association between age

and infection, (P<0.0001). This result agreed with other studies that showed marked increases in the prevalence of bacterial vaginosis in this age group[19-21]. It was found that in the third trimester of pregnancy, 40.7% of study population showed positive results of bacterial vaginosis, which is a high percentage in comparison with second and first trimester, which had 26.9%, 11.7% respectively. Also our results are in a greement with other that showed the bacterial colonization in the vagina increased during the third trimester[21,22]. Analysis of 96 identified patients with bacterial vaginosis, found that 29(30.2%) of them had positive history of preterm labour, while among those with no evidence of bacterial vaginosis, 31 patients had a history of preterm labour. There was a significant higher rate of preterm labour with bacterial vaginosis infection (P<0.05), and there was an increased risk for preterm delivery (Odds ratio 2.9). And the present results agree with other[23-25]. However our results were lower than those which showed an increased risk of preterm delivery with infections[26]. Present study registered no significant relationship between abortion, ectopic pregnancy & bacterial vaginosis, as the odds ratios were 0.9,1.2 respectively while other study supports the role of bacterial vaginosis for abortion with an odd ratio of 3.7[26]. The measurement of vaginal pH among pregnant women, revealed a high sensitive rate (92%), with low specific rate (66%). This result agrees with other studies 2001[20,21]. The clue cells and swiff tests are frequently used in clinical practice, present results showed a sensitivity of 87%, 78% and specificity of 81%, 67% respectively. These are in line with another study[8]. Our results showed that, out of 96 pregnant women with bacterial vaginosis, 89 patients showed a positive isolates of G. vaginalis and 48 patients out of 239 without bacterial vaginosis also showed positive isolates of G. vaginalis. When we compared the cultural technique with clinical tests, we found that isolation of *G. vaginalis* with less efficiency and less validation in diagnosis of bacterial vaginosis, as it had a low rate of specificity (79%) than that of Amsel's criteria (95%). *Candida albicans* was the next commonly isolated organism with prevalence rate of 11.9%. This result was within the range of others reported values 2.2% to 20%[27,28,21]. *Staphylococcus aureus* and *Staphylococcus saprophyticus* showed higher rates with 7.4% and 4.8% respectively, the *B-haemolytic streptococcal, T-vaginalis and N-gonorrhoeae* were among the lowest rates. These are similar to others reported rates which range from 3.5% to 15.5%[21,29-31].

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